

providing a sensor opposite to the marks on the rotational surface of the rotary shaft, the sensor being operable to generate pulses when the marks pass the sensor during rotation of the rotary shaft; and

measuring the axial elongation of the rotary shaft from a change in an interval ratio of the pulses generated by the sensor when the marks pass the sensor during rotation of the rotary shaft.

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15. (Amended) The method of claim 14, wherein the marks comprise a reference mark and a measuring mark, and wherein the interval ratio of the pulses is the ratio of the time from detection of the reference mark until detection of the measuring mark to the time it takes for one rotation of the rotary shaft as determined by the sensor.

16. (Amended) The method of claim 14, wherein the sensor is fixed.

18. (Amended) A rotary shaft axial elongation measuring device, comprising:
two marks provided on a rotational surface of a rotary shaft, wherein said marks are oppositely inclined to one another relative to an axial direction of the rotary shaft such that a circumferential direction interval between the marks change according to the axial direction position along the rotary shaft;

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a sensor positioned opposite to the marks on the rotational surface of said rotary shaft, said sensor being operable to generate pulses when said marks pass said sensor during rotation of the rotary shaft; and

a data processing part operable to determine axial elongation of the rotary shaft from a change in an interval ratio of the pulses generated by said sensor when said marks pass sensor during rotation of the rotary shaft.

19. (Amended) The rotary shaft axial elongation measuring device of claim 18, wherein said plurality of marks comprises a reference mark and a measuring mark.

c3 21. (Amended) The rotary shaft axial elongation measuring device of claim 20, wherein said sensor is any one of a capacitance type gap sensor, an eddy current gap sensor and a photoelectric sensor.

c4 23. (Amended) The rotary shaft axial elongation measuring device of claim 22, wherein said sensor is any one of a capacitance type gap sensor, an eddy current gap sensor and a photoelectric sensor.

24. (Amended) The rotary shaft axial elongation measuring device of claim 19, wherein said sensor is any one of a capacitance type gap sensor, an eddy current gap sensor and a photoelectric sensor.

29. (Amended) The rotary shaft axial elongation measuring device of claim 18, wherein said sensor is any one of a capacitance type gap sensor, an eddy current gap sensor and a photoelectric sensor.

c5 30. (Amended) The rotary shaft axial elongation measuring device of claim 18, wherein said plurality of marks comprises a reference mark and a measuring mark, and wherein the interval ratio of the pulses is the ratio of the time from detection of the reference mark until detection of the measuring mark to the time it takes for one rotation of the rotary shaft as determined by said sensor.

31. (Amended) The rotary shaft axial elongation measuring device of claim 18, wherein said sensor is fixed.